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DISTRIBUTION, INCIDENCE, AND DAMAGE CAUSED BY THE PITCH CANKER FUNGUS ON SLASH PINE, APALACHICOLA NATIONAL FOREST, FLORIDA 1980

by

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ABSTRACT

During the spring of 1980, a survey was made on the Apalachicola National Forest to determine the incidence of pitch canker. Fifty plots each containing 300 slash pine trees were surveyed. Twenty-four percent of these had more than 3 percent infection. There was an average of 40 percent infection in the affected stands. The infected stands ranged in age from 6-16 years and were planted or seeded slash pine. Pitch canker is not serious enough at this time to affect stand management, but the potential for future outbreaks is very real.

INTRODUCTION

During the past several years, pitch canker, caused by the fungus Fusarium moniliforme var. subglutinans, has caused substantial growth losses, deformity, and mortality in Florida slash pine stands. The disease causes a shoot dieback in the spring due to pitch-soaked cankers that girdle the tree. Needles on recently killed shoots are yellow to reddish-brown. Generally, the terminal shows symptoms first with the third and fourth flushes being attacked most frequently. The most common damage is growth

loss and deformity which greatly reduces yields from these areas. A 1976 survey of the National Forests in Florida showed the Apalachicola was the only forest with enough pitch canker to be concerned about. The present evaluation was made in March of 1980, to determine if there was any change in incidence and distribution of pitch canker on the Apalachicola.

METHOD

The forest was gridded on a secondary road system with 3 miles between plots and a 5-mile intersect between roads. The fusiform rust method of sampling three randomly selected 100-tree transects per stand was used throughout the survey. If a stand appeared to be healthy or had 3 percent or less than 3 percent infection, only the age of that stand was recorded and the survey proceeded to the next area. Only slash and predominantly slash pine stands mixed with some longleaf pine were observed, since little pitch canker has been reported in longleaf stands. Data were collected as follows:

1. Type of stand (plantation, natural or seeded)

2. Length and width of each transect

3. Stand age by increment coring three dominant trees

4. Diameter at breast height for each tree

5. Location of each stand on a map

6. Infection data were recorded from observations made on this year's new growth and last year's growth. A percent infection code was included for all growth on the tree.

   Infection data:

   1 - Healthy
   2 - Infected terminal
   3 - Infected lateral
   4 - Infected terminal and lateral

   Percent infection on total tree:

   a - 1-10%
   b - 11-25%
   c - 26-50%
   d - More than 50%

RESULTS

The results of this survey are summarized in Table 1. The observed stands ranged in age from 4-44 years. Seventy-two percent of the stands had some infection but only 24 percent of the plots had more than 3 percent of the trees infected. Infection occurred in stands between the ages of 6-16 years with the highest amount occurring from 6 to 10-year old stands. On the average, 40 percent of the trees were infected in the stands that had at least 4 percent infection. Infection occurred only in the planted and seeded slash pine stands. An average of 7 percent of the infected trees had lost their terminal with a high of 38 percent in one stand. The largest category for foliage loss was the 10 percent rating with an overall mortality of 0.5 percent. An average of 5 percent of the infected trees had lost both their current and old terminal with an average of 18 percent for one stand. In general, the infected stands were affected in 1979 and the disease continued in 1980 (Table 1). The 1980 infection of 4 percent or greater did not occur without 1979 infection. Seventy-five percent of the infected stands occurred on the Apalachicola Ranger District.

As shown in Table 2, the infected stands in the 1980 survey with at least 4 percent infection were in the 6 to 16-year range; in the 1978 survey, the 9 to 20-year range and in the 1976 survey, the 10 to 21-year range. The percent of stands infected is lower this year. In 1978, 42 percent of the stands were infected as compared with only 24 percent in 1980 and 3.6 percent in 1976. The average amount of infection in stands with at least 4 percent infection was 40 percent for 1980, 24 percent in 1978, and 15 percent in 1976.

DISCUSSION

About 72 percent of the slash pine stands on the Apalachicola had some trees with pitch canker. The percent of stands with over 4 percent infection is reduced over the 1978 survey but the percent of trees infected per stand has increased. Mortality is low, leaving deformity as the greatest impact. At this time, pitch canker does not present a problem for managing the affected stands. Enough disease-free trees remain to carry the stands to rotation. Some losses may occur in thinnings.

With pitch canker distributed thoughout the Forest, there is a potential for an outbreak with serious economic losses.

Table 1.-- ; and percent infection in number of trees by sta and type of symptom for infected stands on the A, iachicola National Forest, Florida - 1980.

Stand No.	Age	Average d.b.h.	% Infect.	Tree Rating % a 1-10%	b 11-25%	c 26-50%	d 50%	1980 Growth Infect. term.	Infect. lateral	Infect. term. & lateral	Dead from other	1979 Growth Infect. term.	Infect. lateral	Infect. term & lateral	Dead from pitch canke
				Apalachicola Ranger District											
1	10	3.1	64.0%	49.0%	8.0%	1.0%	6.0%	2.0%	29.0%	25.0%	0	16.0%	19.0%	16.0%	0
2	11	2.1	15.0%	14.0%	0	0	0.3%	2.0%	6.0%	4.0%	0	3.0%	0	1.0%	0
3	12	3.3	42.0%	33.0%	4.0%	2.0%	3.0%	19.0%	13.0%	18.0%	1.0%	4.0%	11.0%	2.0%	0.3%
4	16	5.0	42.0%	29.0%	7.0%	2.0	3.0%	7.0%	11.0%	19.0%	2.0%	11.0%	5.0%	4.0%	1.0%
5	18	-	3.0%												
6	10	4.0	49.0%	41.0%	4.0%	1.0%	3.0%	13.0%	6.0%	29.0%	0.3%	5.0%	8.0%	6.0%	0.3%
7	7	1.9	6.0%	6.0%	0	0	0	2.0%	2.0%	2.0%	0	1.0%	0	0	0
8	32	-	1.0%												
9	37	-	0												
10	8	-	0												
11	6	-	1.0%												
12	31	-	0												
13	9	-	2.0%												
14	25	-	0												
15	6	-	1.0%												
16	5	-	2.0%												
17	39	-	2.0%												
18	9	3.8	48.0%	33.0%	5.0%	4.0%	3.0%	8.0%	6.0%	31.0%	0	2.0%	10.0%	3.0%	2.0%
19	7	-	3.0%												
20	30	-	3.0%												
21	9	-	2.0%												
22	4	-	2.0%												
23	39	-	1.0%												
24	6	2.7	24.0%	22.0%	1.0%	1.0%	0.3%	7.0%	3.0%	13.0%	0	3.0%	2.0%	1.0%	0

Table 1 cont'd

Stand No.	Age	Average d.b.h.	% Infect.	Tree Rating % a 1-10%	b 11-25%	c 26-50%	d 50%	1980 Growth Infect. term.	Infect. lateral	Infect. term. & lateral	Dead from other	1979 Growth Infect. term.	Infect. lateral	Infect. term & lateral	Dead from pitch canker
				Apalachicola Ranger District											
25	8	3.4	48.0	32.0%	8.0%	2.0%	3.0%	7.0%	7.0%	28.0%	0.3%	5.0%	7.0%	7.0%	2.0%
				Wakulla Ranger District											
26	25	-	1.0%												
27	28	-	0												
28	6	-	1.0%												
29	35	-	2.0%												
30	36	-	1.0%												
31	27	-	0												
32	10	1.7	30.0%	25.0%	3.0%	1.0%	1.0%	8.0%	8.0%	10.0%	0.3%	4.0%	1.0%	2.0%	0
33	35	-	0												
34	8	-	0												
35	44	-	0												
36	39	-	1.0%												
37	24	-	0												
38	9	-	3.0%												
39	6	-	0												
40	18	-	0												
41	24	-	0												
42	6	-	3.0%												
43	9	-	2.0%												
44	35	-	1.0%												
45	6	-	2.0%												

Table 1 cont'd

Stand No.	Age	Average d.b.h.	% Infect.	Tree Rating % a 1-10%	b 11-25%	c 26-50%	d 50%	1980 Growth Infect. term.	Infect. lateral	Infect. term. & lateral	Dead from other	1979 Growth Infect. term.	Infect. lateral	Infect. term & lateral	Dead from pitch canker
				Wakulla Ranger District											
46	11	3.1	57.0%	35.0%	11.0%	6.0%	4.0%	8.0%	14.0%	33.0%	1.0%	1.0%	19.0%	0.3%	0.3%
47	15	5.2	49.0%	45.0%	2.0%	0.7%	0.7%	3.0%	38.0%	7.0%	0.3%	1.0%	4.0%	0	0
48	21	-	1.0%												
49	17	-	0												
50	25	-	1.0%												
Average			39.6 ± .5 [1/]	30.3 ± 3.6	5.3 ± 1.0	2.1 ± 0.5	2.5 ± 0.5	7.2 ± 1.4	12.0 ± 3.1	18.3 ± 3.2	0.7 ± 0.3	4.4 ± 1.3	8.6 ± 2.0	4.2 ± 1.5	1.0 ± 0.3

[1/] Standard error of the mean ± 1

Table 2.--Number and percent of slash pine stands infected by Fusarium moniliforme var. subglutinans by age and type of stand on the Apalachicola National Forest, Florida - 1976, 1978 and 1980.

1980 Survey	Stand Age	No. Stands Observed	No. Stands Infected	% Natural	% Seeded & Planted	% Natural Infected	% Seeded & Planted Infected
	1-10	22	7	0	100	0	32
	11-20	8	5	25	75	0	83
	21-30	9	0	100	0	0	0
	31-40	10	0	80	20	0	0
	41-65	1	0	0	100	0	0
1978 Survey							
	1-10	15	1	0	100	0	7
	11-20	23	20	4	96	0	96
	21-30	5	0	20	80	0	0
	31-40	3	0	66	34	0	0
	41-65	6	0	66	34	0	0
1976 Survey							
	1-10	2	1	0	100	0	50%
	11-20	10	4	0	100	0	40%
	21-30	5	1	0	100	0	20%
	31-40	7	0	14	86	0	0
	41-65	1	0	0	100	0	0

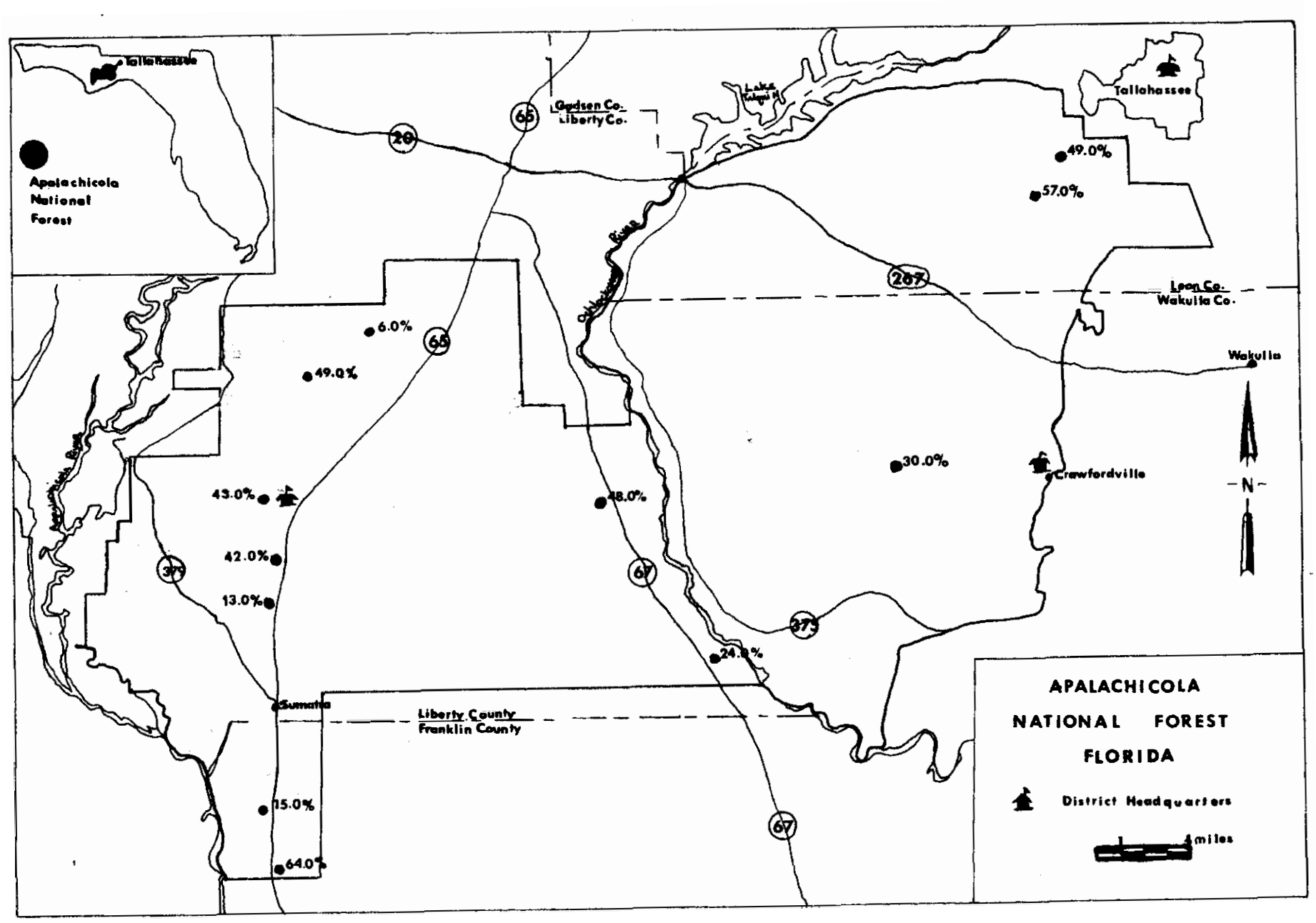

Figure 1.--Location of infected plots and percent infection on the Apalachicola National Forest - 1980.

LITERATURE CITED

Yandel, D. O., and E. R. Roth. 1971. Survey procedure for fusiform rust. U.S. Dept. of Agri. Forest Ser., SA-S&PF.